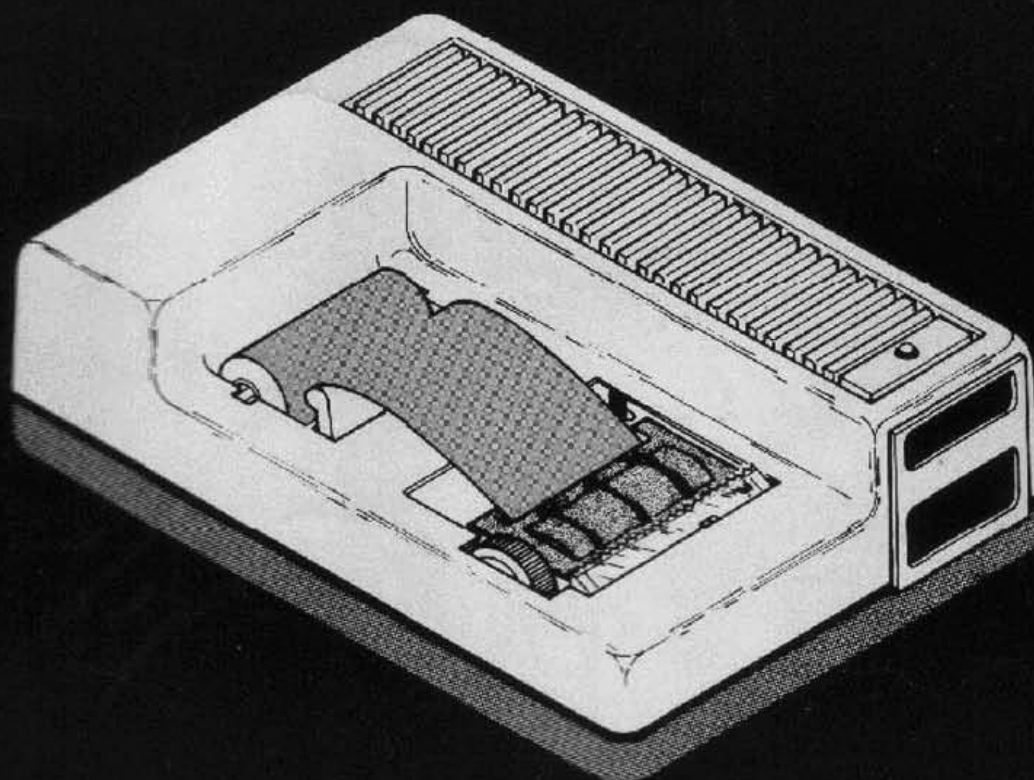


# Quick Printer II

Catalog Number 26-1155

**Radio Shack**  
**TRS-80**  
**MICRO**  
**COMPUTER**  
**SYSTEM**

**HARDWARE**



CUSTOM MANUFACTURED BY RADIO SHACK  A DIVISION OF TANDY CORPORATION

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## **Congratulations for selecting this Radio Shack computer product!**

The Quick Printer II is a compact, affordable and extremely versatile line printer. You can connect it directly to the TRS-80, to the Expansion Interface via an optional cable, or to a serial (RS-232C) output unit. A built-in microprocessor controls the Printer and communicates with the output device (TRS-80 or other Computer, etc.).

Other exceptional features include:

- Upper and lower case characters
- Software selectable 16 and 32 characters/line printout
- Switch-selectable inputs: TRS-80, TRS-80 Expansion Interface, or Serial Interface
- ON-LINE/BUSY/RESET Switch
- Automatic "wrap-around" when text exceeds maximum line length – no lost data due to overflow

**Note:** The Quick Printer II is supplied with a cable for connection to the TRS-80. For connection to the TRS-80 Expansion Interface, you need to buy an optional extra cable, Catalog Number 26-1406.

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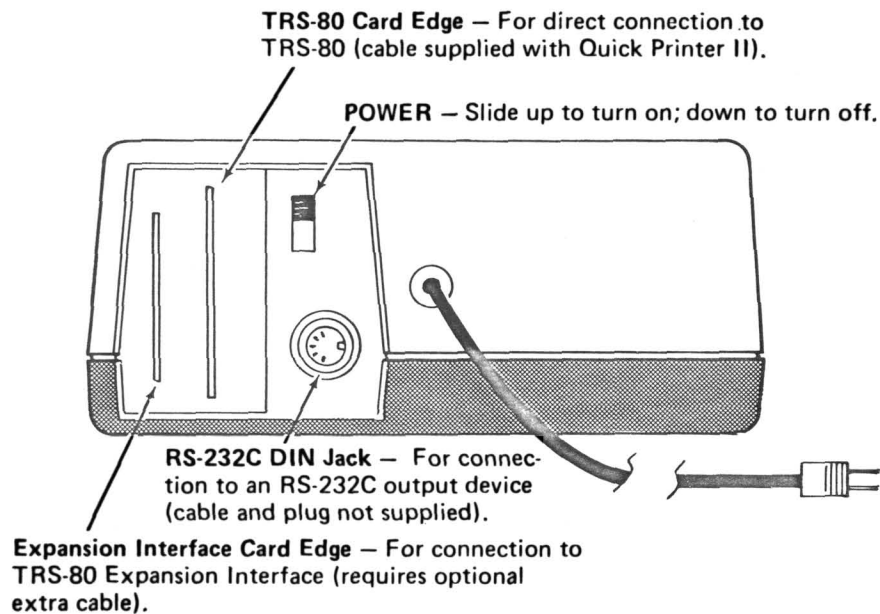
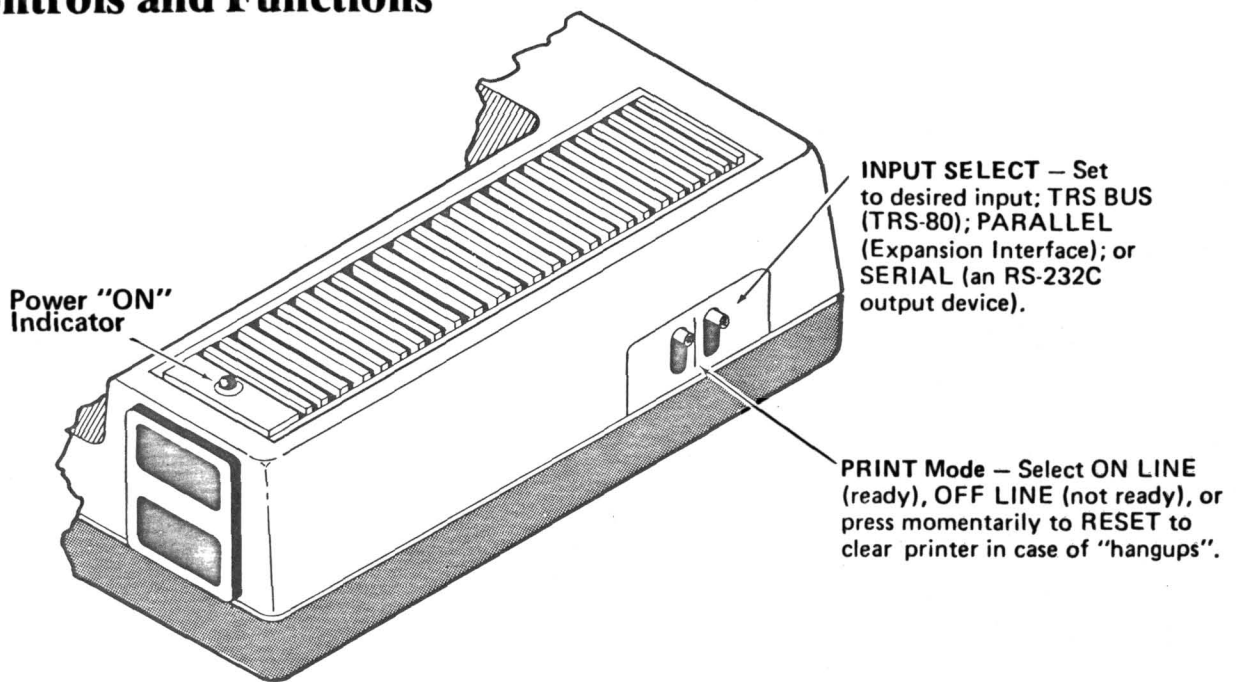
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## Controls and Functions



### Paper Loading Instructions

Try not to touch the shiny surface of the paper — hold it by the edges instead. Fingerprints mar the printing surface and cause uneven printing.

1. Put the paper spindle into the paper roll as shown in Figure 1, so the narrow end of the spindle is on the right and the paper feeds downward from the back, with the shiny side down.
2. Mount the larger end of the spindle in the larger slot, and the narrow end into the smaller slot on the other side of the paper compartment.

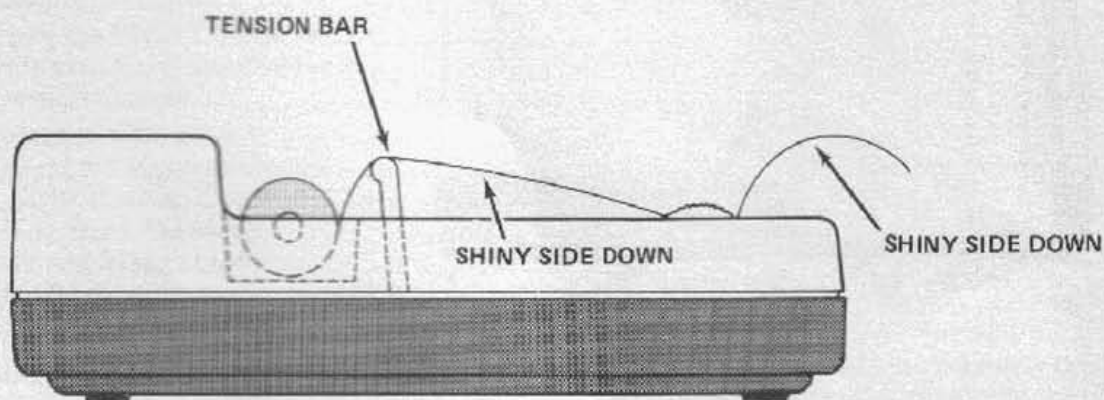
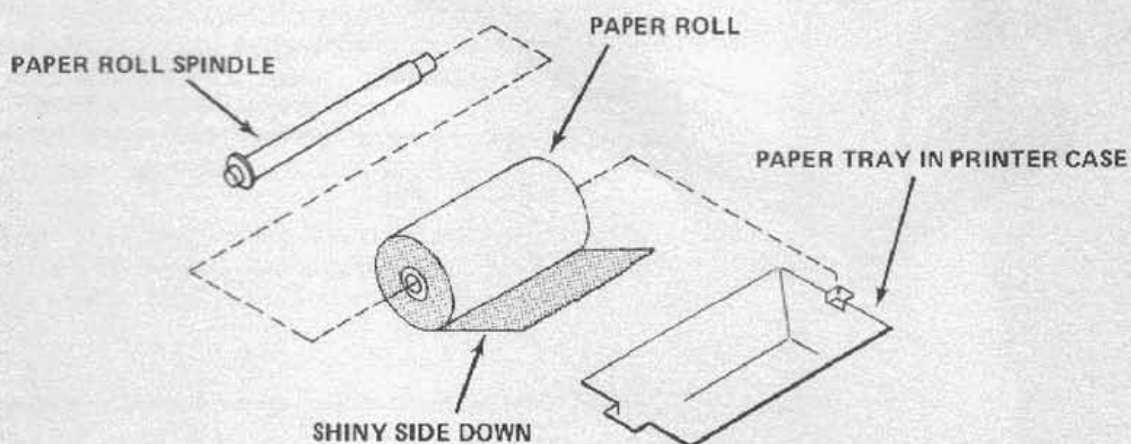
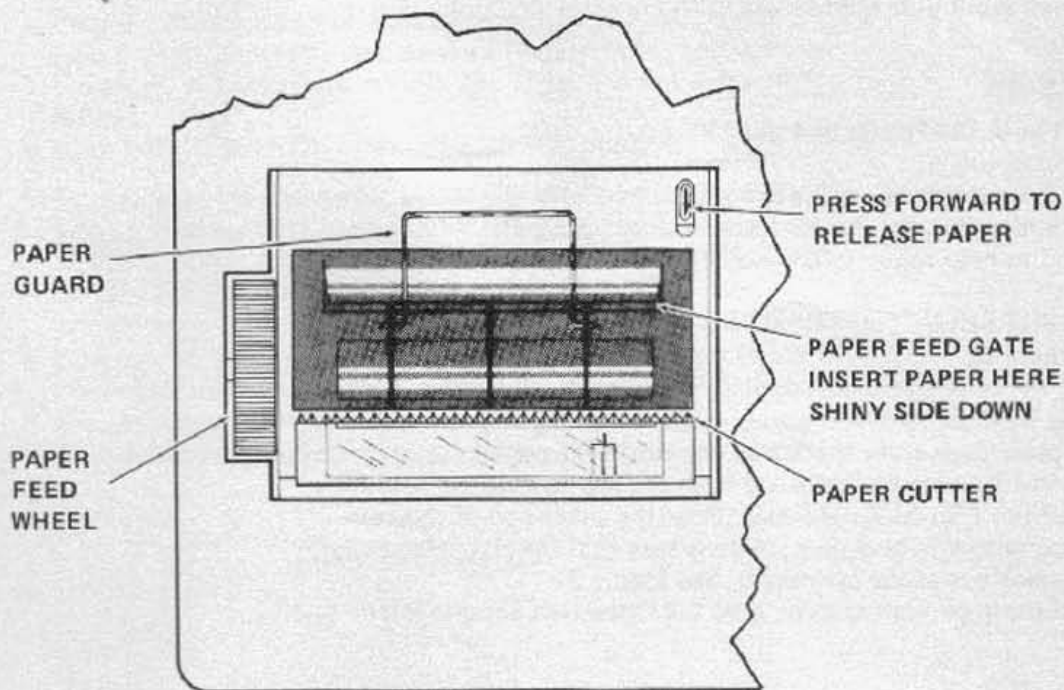


Figure 1. Inserting the paper roll.

3. Unroll about six inches of paper, and guide the leading edge of the paper over the tension bar and down into the feed gate (Figure 2). Rotate the paper-feed wheel until the paper comes up behind the print mechanism and the paper cutter edge.



**Figure 2. Detail of paper motion mechanism.**

## To Remove the Paper Roll:

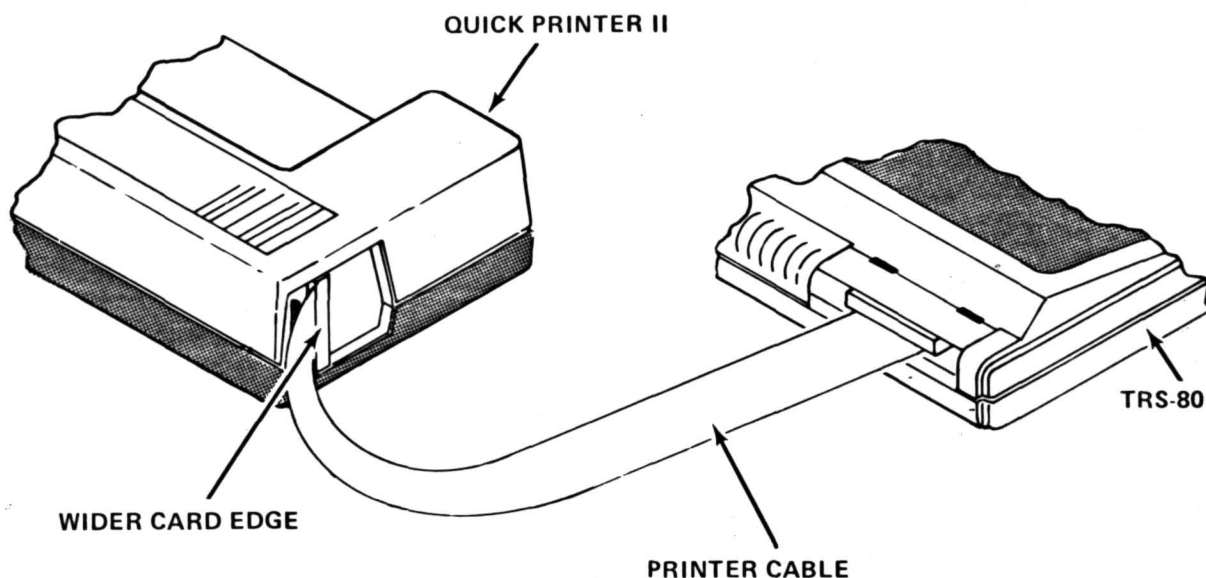
Press and hold the paper release lever forward, and rotate the roll backwards until the leading paper edge is free of the paper drive wheel.

### Connection

You can connect the Quick Printer II directly to the TRS-80 card-edge; to the TRS-80 Expansion Interface Line Printer card-edge; or to another device equipped with an RS-232C Interface. There is a separate input jack for each of these options, and a switch to tell the Printer which input you want to use.

#### To a TRS-80

1. Turn off both the Printer and the TRS-80.
2. Load printer-paper.
3. Plug the Printer power cord into a source of 120 VAC, 60 Hz power. Notice that the Printer has a "safety" plug with a built-in ground to help assure reliable operation. Do not defeat this ground.
4. Slide **INPUT SELECT** to TRS BUS position.
5. Notice there are two card-edges at the back of the Printer. Connect the two-foot cable supplied with the Quick Printer II to the wider of these two card-edges, as shown in Figure 3. Be sure the flat cable exits from the left of the card-edge connector.
6. Remove the Expansion Port door from the left rear of the TRS-80 to expose the TRS BUS card-edge. Mate the other end of the two-foot cable onto this card edge, making sure that the flat cable exits from the bottom of the connector. See Figure 3.
7. Before turning on your system, read the **Operation** Section later on.



**Figure 3. Connection to TRS-80 Card-Edge**

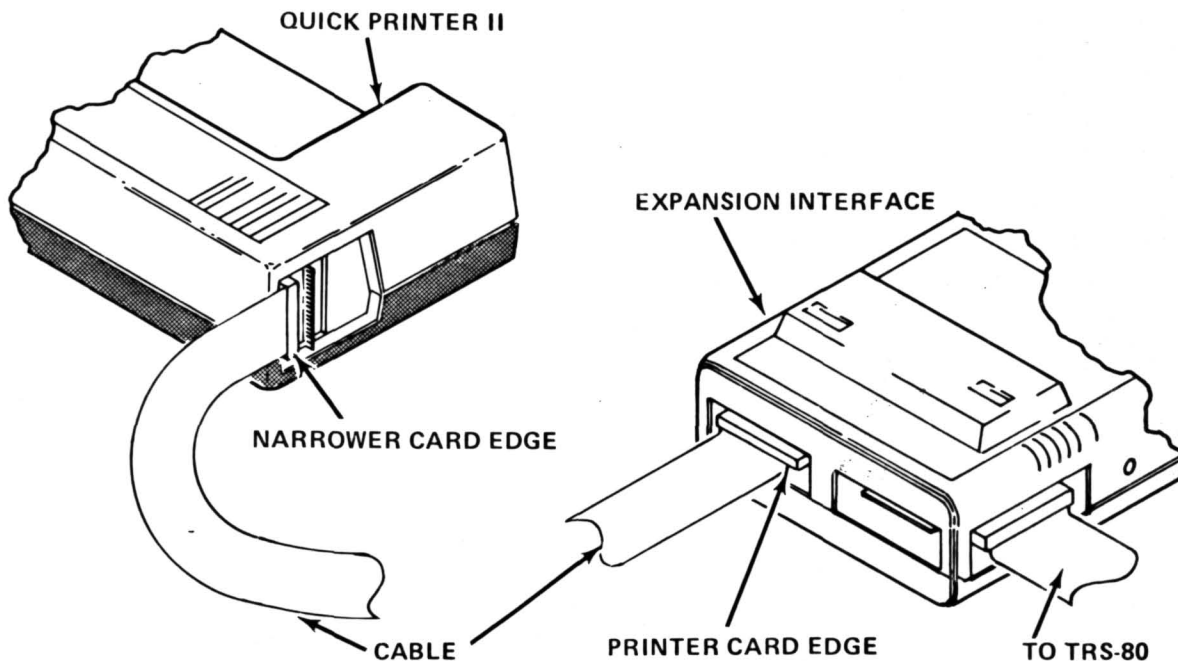
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## To a TRS-80 Expansion Interface

**Note:** To make this connection, you'll need an optional extra cable, Catalog Number 26-1406.

1. Turn off both the Printer and the TRS-80.
2. Load printer-paper.
3. Plug the Printer line cord into a source of 120 VAC, 60 Hz power. Notice that the Printer has a "safety" plug with a built-in ground to help assure reliable operation. Do not defeat this ground.
4. Slide **INPUT SELECT** to the **PARALLEL** position.
5. Notice there are two card-edges at the back of the Printer. Connect the special Quick Printer II/Expansion Interface cable to the narrower of these two card-edges, as shown in Figure 4. Be sure the flat cable exits from the left of the card-edge connector.
6. Connect the other end of the special cable to the Line Printer card-edge, making sure the flat cable exits from the bottom of the connector. See Figure 4.
7. Before turning on your system, read the **Operation** Section later on.



**Figure 4. Connection to TRS-80 Expansion Interface  
Printer Card Edge.**

## SETTING UP

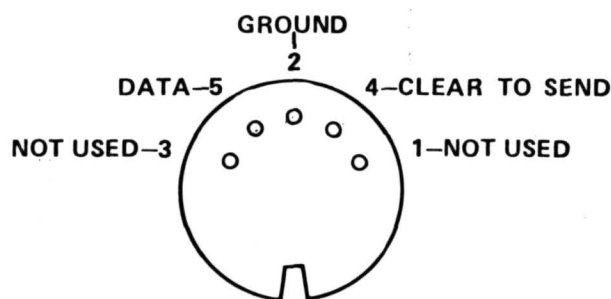
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### To a Serial Output Device

#### Cable Assembly

You will need to assemble a special three-wire cable to make this connection. Attach a DIN plug to one end for connection to the Quick Printer II and connect as follows:

Pin #	Signal	Function
4	CLEAR TO SEND (LP output)	Handshake
5	DATA (input to LP)	Serial data input
2	GND	Ground to System Common



(Viewed from end of plug)

#### Connection

1. Turn off both the Printer and the Serial Device.
2. Load printer-paper.
3. Plug the Printer line cord into a source of 120 VAC, 60 Hz power. Notice the Printer has a "safety" plug with a built-in ground to help assure reliable operation. Do not defeat this ground.
4. Slide **INPUT SELECT** to **SERIAL** position.
5. Attach your custom-made connector to the DIN jack on the rear of the Printer, below the **POWER** switch. Connect the other end of the cable to your serial output equipment.
6. Before turning on the system, read the Sections, **Operation** and **Using with a Serial Interface**, later on in this manual.



## Power-On/Power-Off Sequence

If you turn the Printer on or off while the Computer is on, the Computer may “lock up” (the keyboard may appear “dead”, the Computer may lose any BASIC program in memory, etc.).

To avoid this problem, always turn on your Expansion Interface (if connected) first, then the Printer, and lastly, the TRS-80 (or other serial output device).

For the same reason, do not turn off the Printer until you are through using the Computer.

(The Quick Printer II is a solid-state device with no moving parts, except during actual printing. So you don't need to worry about leaving it on during an entire session with the Computer — when it is not printing, the unit is totally silent and consumes very little power.)

## Power-Up Messages

When you have everything connected, turn on the Printer by sliding the **POWER** switch up to the ON position. When you first turn it on, the Printer will display a ready message to assure you that it is connected properly and that its built-in microprocessor has everything “under control”.

The message also tells you which input you have selected.

```
R+++++++ PRINTER READY ++++++S
```

indicates you have selected the Radio Shack TRS BUS input.

```
E+++++++ PRINTER READY ++++++I
```

indicates you have selected the Expansion Interface input.

```
S+++++++ PRINTER READY ++++++I
```

indicates you have selected the Serial Interface input.

You are now ready to turn on the rest of your system and use the Quick Printer II.

### Using the PRINT Mode Switch

The **PRINT** mode switch has three positions: **ON LINE**, **OFF LINE** and **RESET**, which is a momentary-contact position. Set this switch to **ON LINE**. Now the Quick Printer II will accept output from the Computer and print it out, one line at a time.

**ON LINE/OFF LINE.** To interrupt the Printer at any time – even if it is in a print cycle – without losing data, select the **OFF LINE** setting. The Printer will complete any line it's printing, and then stop. It will tell the Computer, "I'm busy – don't send any more until I'm ready again."

To continue printing, return the **PRINT** switch to the **ON LINE** position.

**RESET.** To **RESET** the Printer, press the **PRINT** switch momentarily to the **RESET** position (down) and release it. This re-initializes the Printer, without requiring you to turn off the system. There are several situations when you may need to Reset the Printer:


- If for any reason you change the **INPUT SELECT** setting while the Printer is on, you will need to Reset the Printer to re-initialize it for the new input. After Reset the Printer will come back with another ready message.
- If you simply want to check the **INPUT SELECT** setting.
- If the Printer's built-in microprocessor ever gets "lost" due to a temporary loss of power or a severe brownout, use **RESET** to get it on track again. (Of course, any characters currently in the print buffer will be lost.)

## Output to the Quick Printer II

The simplest way to drive the Quick Printer II is with LEVEL II BASIC LPRINT and LLIST statements. See the *LEVEL II BASIC Reference Manual* for details.

The Quick Printer II doesn't print each character as it is received — it waits until it has received an entire line and then prints. That's why it's called a line printer instead of a character-printer. Each line can contain up to 32 characters. (There's also a 16-character/line mode, described later under Special Features.)

If the line you are printing exceeds 32 characters, the Quick Printer II will automatically wrap-around to the next line, so no data will be lost.

**Note:** While entering and running programs which output to the Quick Printer II, it will help to put the Video Display in the 32-character/line mode (**SHIFT** ). That way, the lines you see on the Display correspond to what will be LPRINTed or LLISTed.

## Special Features

### Double-Size Mode (16-characters/line)

For special effects like titling pages, printing headings, etc., you can switch the Printer to a double-size mode. In this mode, each line can contain up to 16 characters.

To switch to the double-size mode using LEVEL II BASIC, simply include CHR\$(15) as the first item in your LPRINT list. For example:

```
10 LPRINT CHR$(15) "FAT LETTERS"
```

will produce the following printout:

```
FAT LETTERS
```

**Note:** This will only work if the Printer's holding buffer has been cleared by execution of a carriage return. If the buffer already contains some data, the CHR\$(15) will be ignored.

If you have LPRINTed something with a trailing comma or semi-colon, the buffer won't be printed until it is filled. In such a case LPRINT CHR\$(15) may not put the code at the beginning of the buffer. It will *always* be first if you precede it with an LPRINT " " statement. More later . . .)

When the Printer finishes printing the double-size line, it automatically switches back to the 32-character mode so it will be ready to print a regular 32-character line. Later on, we'll show you how to print long messages in the double-size mode.

## OPERATION

---

Only 16 characters at a time can be printed in the double-size mode. If you exceed 16 characters, the printer automatically wraps around to the next line and reverts to the 32-character/line mode.

**Note:** LLIST always uses the 32-character/line mode.

For details on using the double-size mode (e.g., how to print long messages in the double-size mode), see **Control Codes**, later on.

### Lower Case Characters

Although the Quick Printer II cannot produce the TRS-80 Video graphics characters, it *can* produce both upper and lower case letters, plus many other symbols. See **Printable Characters** for a complete listing.

Here are a couple of ways to use this capability from LEVEL II BASIC.

1. You can enter the lower-case characters from the keyboard when you are setting up messages and values to be LPRINTed. Even though the Display will show a capital letter, it will be stored in memory as lower-case.

To enter a lower case character from the keyboard, hold down **SHIFT** key while hitting the key (just the opposite from a normal typewriter).

For example, type in the following line, holding down the **SHIFT** key wherever you want a lower-case letter:

```
100 LPRINT"Press SHIFT for l.c."
```

You will see the lower case letters when you LLIST the line, or when you RUN it – even though the line appears on the Display as all capitals.

2. You can LPRINT the ASCII codes for the lower case characters, using the CHR\$ function. For example:

```
100 FOR I% = 97 TO 122
110   LPRINT CHR$(I%); " ";
120 NEXT
```

**Note:** Be careful about using lower-case letters outside of quotes in your BASIC programs. There are some cases where this will produce a hard-to-find syntax error. For example, the statement,

```
100 PRINT@120;"HI"
```

won't work if you used a **SHIFT** –@ instead of a simple @.

---

## Details of Operation

The Quick Printer II stores characters for printing until one of two things happens:

1. Its 32-character holding buffer is filled
2. It receives a carriage-return code (hexadecimal 0D)

When (1) or (2) occurs, the Printer prints out the contents of its 32-character buffer. If the buffer is empty when the carriage return is received, the Printer simply advances the paper one line, leaving a blank line in the printout.

## Control Codes

According to the American Standard Code for Information Interchange (ASCII), there are 32 control codes in addition to the codes for the printable characters. (Control codes are sent as data, but the receiving device interprets them as abbreviated "instructions", communications-status messages, etc.)

The Quick Printer II will recognize two of these control codes:

Function	Code	
	Hex	Decimal
Carriage Return	0D	13
SHIFT IN (16 char/line)	0F	15

It will ignore all other control codes.

**Note:** To output a control code from LEVEL II BASIC, use the CHR\$ function, as follows:

```
100 LPRINT CHR$(13)
110 LPRINT CHR$(15)
```

Whenever a carriage-return code is received, the Printer will print out the current contents of its holding buffer, then clear the buffer to get ready for the next line of data.

For example, you can force several carriage returns with a single LPRINT statement as follows:

```
100 LPRINT "1 2 3"CHR$(13)"-----"
```

will produce:

```
1 2 3
-----
```

## OPERATION

The Shift In code tells the Printer to switch to the 16-character/line format. It must be the first code received by the Printer after a carriage return, otherwise it will be ignored.

This means that you cannot mix the normal and the double-size characters on the same line. Once you select the double-size, the Printer will remain in that mode until . . .

- A) It has printed 16 characters
  - or
  - B) It reaches the end of the line
- whichever comes first.

One way to print long messages in the double size mode with BASIC LPRINT statements is to insert CHR\$(13) CHR\$(15) pairs in the LPRINT list every 16th character or so. For example:

```
100 DB$=CHR$(13)+CHR$(15)
110 LPRINT DB$"THIS IS GOING"DB$
    "TO BE A"DB$"LONG MESSAGE"
```

### Printable Characters

The Quick Printer II can produce all ASCII characters from hex 20 through hex 7F (decimal 32 through 127). Here's what they look like:

```
! " # $ % & '
( ) * + , - . /
0 1 2 3 4 5 6 7
8 9 : ; < = > ?
@ A B C D E F G
H I J K L M N O
P Q R S T U V W
X Y Z [ \ ^ _
` a b c d e f g
h i j k l m n o
p q r s t u v w
x y z { | } ~ ■
```

Note that four of the codes are different from the usual ASCII character set.

Hex Code	Dec. Code	ASCII char.	Quick Printer II char.
5B	91	[	↑
5C	92	\	↓
5D	93	]	←
5E	94	^	→

The arrows are more useful since they correspond to the TRS-80's Video Display character set.

## Assembly Language Output from a TRS-80

Here's a subroutine to output a single byte to the Quick Printer II. Load the data byte in ASCII into the A-register, then call the subroutine. To force a carriage return, load register A with hex OD.

```
PRTDVR LD  A,(37E0H) ;STATUS
        AND 0F0H      ;MASK
        CP  30H       ;BUSY?
        JR  PRTDVR    ;IF YES
        LD  A,C        ;SEND-IT
        LD  (37E0H),A
        RET           ;RETURN
```





## Using with a Serial Output Device

### RS-232C Setting

Set up your Serial Output equipment as follows:

**Transmission rate:** 600 baud

**Error/checking and parity,** choose one of the following:

- A. 7-bit data, even or odd parity, one or two stop bits
- B. 7-bit data, no parity, two stop bits
- C. 8-bit data, no parity, one or two stop bits

**Note:** Quick Printer II does not test for parity errors.

In the Serial Interface mode, the Quick Printer II's built-in microprocessor receives data and converts it into seven-bit ASCII codes (the eighth bit is always set to zero). These codes are then processed as follows:

If it's a carriage-return code, the printer will print out contents of the holding buffer (actually a stack). If the character is a Shift In (hex 0F), and the holding buffer is empty, the Printer will convert to double-size mode (16-character/line). All other control codes are ignored.

If it's a printable-character, the Printer will put it in the holding buffer. When the buffer is full, the Printer will print out the line currently in the holding buffer.

Since the microprocessor also controls the Printer mechanism, it cannot receive data during a print cycle. During this period, the CLEAR TO SEND output serves as a busy indicator to the serial device.

Many output devices will continue to send data after receiving a busy (CLEAR TO SEND=Mark) indication from the Printer. The Quick Printer II is programmed to accept one "extra" word so it won't be lost.

However, if the output device sends more than one word after CLEAR TO SEND=Mark, these extra words will be lost. Some other output devices are not equipped to recognize a CLEAR TO SEND signal at all.

In both the preceding cases, you must write a driver routine which gives the Quick Printer II time to process each byte and to print out each line.

## OPERATION

### Details of the Quick Printer II Handshake

Assume that you have just reset the Printer, and that it is in the Serial Interface mode. When the built-in microprocessor (CPU) receives a valid start bit, it assembles the first word of serial data. After a stop bit has been received, CLEAR TO SEND will go from Space (positive) to Mark (Negative). The word just assembled is temporarily stored, and a timer is started. Then one of two things happens:

- A. If another start bit is recognized within 20.5 milliseconds, this next character will also be assembled. After the stop bit of the second character is received, the second word is temporarily stored and the first word is retrieved and processed. Then the second word is retrieved and processed, and CLEAR TO SEND is set to Space (not busy).
- B. If another start bit is not recognized within 20.5 mS after the first character is stored, the CPU will simply process the first character as described above, and set CLEAR TO SEND=Space.

See Figure 5 for a simplified flow chart of this handshake process.

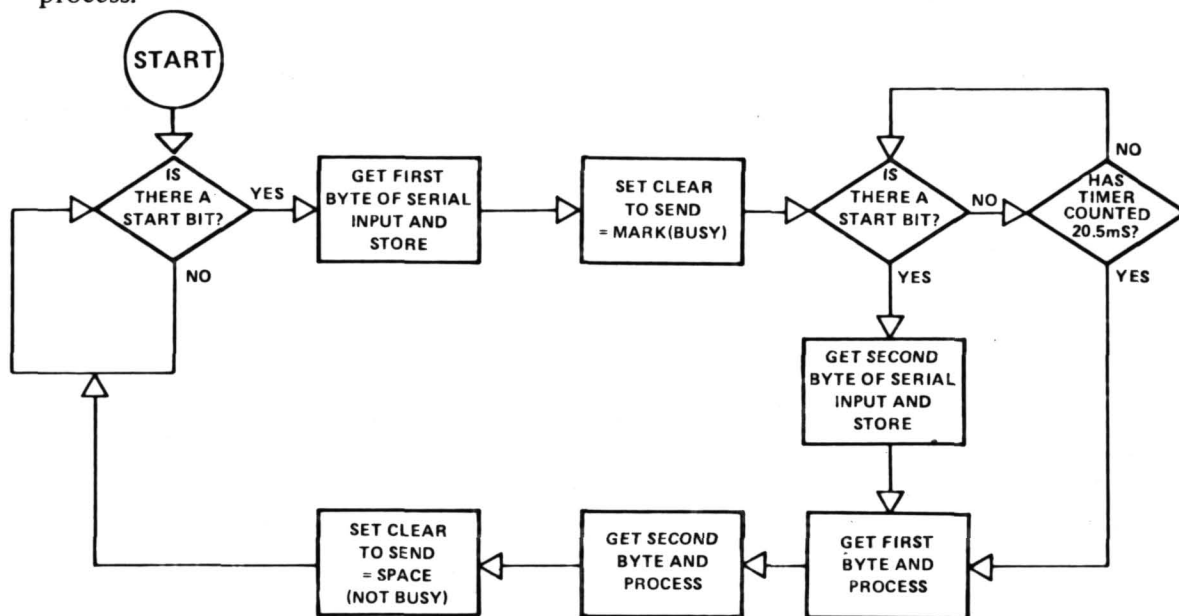


Figure 5. Quick Printer serial input routine to allow for one “extra” byte of data

---

## If You Have Problems

We hope you don't . . . but just in case . . . see if you can solve them by using the table below. If you can't, then try to determine which component in your system is at fault, and bring it into your local Radio Shack for repair. We'll have it back ASAP!

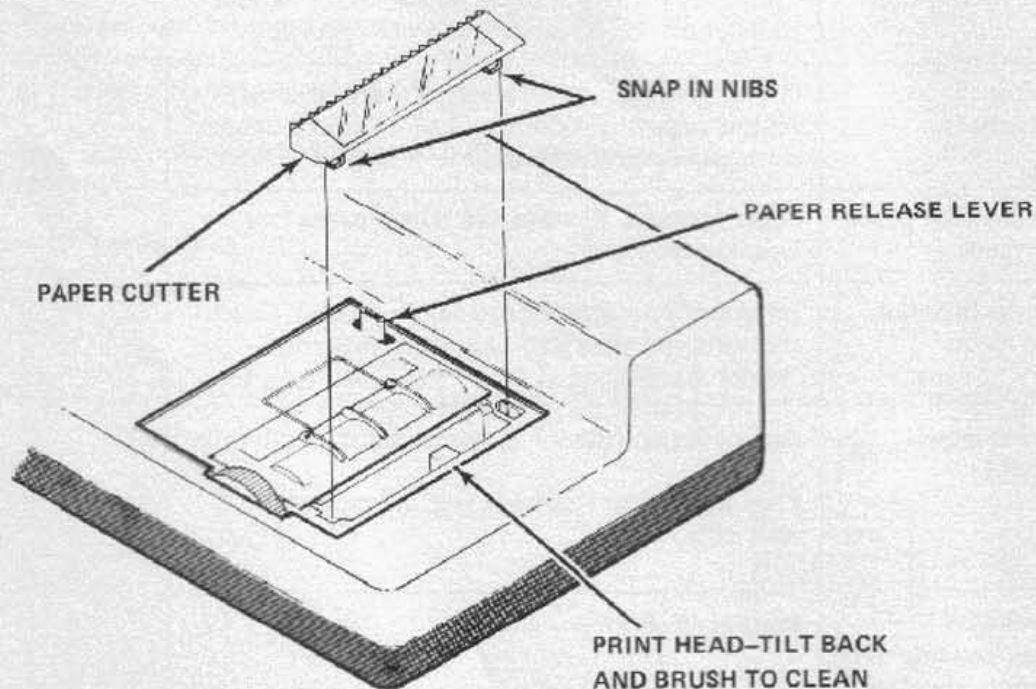
Problem	Probable Causes/Solutions
TRS-80 won't operate	Cable on upside down or Printer power is OFF. Check connection and power switches. Power-up again according to Power-Up Sequence.
TRS-80 okay, but won't line-print	Cable not attached; wrong INPUT selected; Printer OFF LINE; Printer power is OFF. Check connection and all control and power settings.
Printer runs continuously	Cable on upside down; wrong INPUT selected; Printer's microprocessor is "lost". Check connections and control settings, and Reset the Printer.
Printer okay, but paper won't advance	Paper jammed. Remove and reload paper (see Loading the Paper)
Many errors in Serial Interface mode	Improper connections; bad safety ground. Check the wiring to your DIN plug, and ensure the Printer is grounded at the power cord.
Printer characters are too light	Paper contaminated – remove a short length of it.  Print head dirty – clean it (see instructions later on).
Prints broken characters (missing dots) or extra dots and lines	Print head shorted – clean it.

## Care and Maintenance

The Quick Printer II requires very little maintenance. Simply treat it with the same care you'd give any electro-mechanical device — avoid physical shocks; keep it dry, etc.

The printer mechanism requires no lubrication.

If the print-quality deteriorates, you probably need to clean the print head. Remove the paper cutter (slide it to the left and lift it off). With small, fine brush, remove any debris from the print head. Replace the paper cutter.



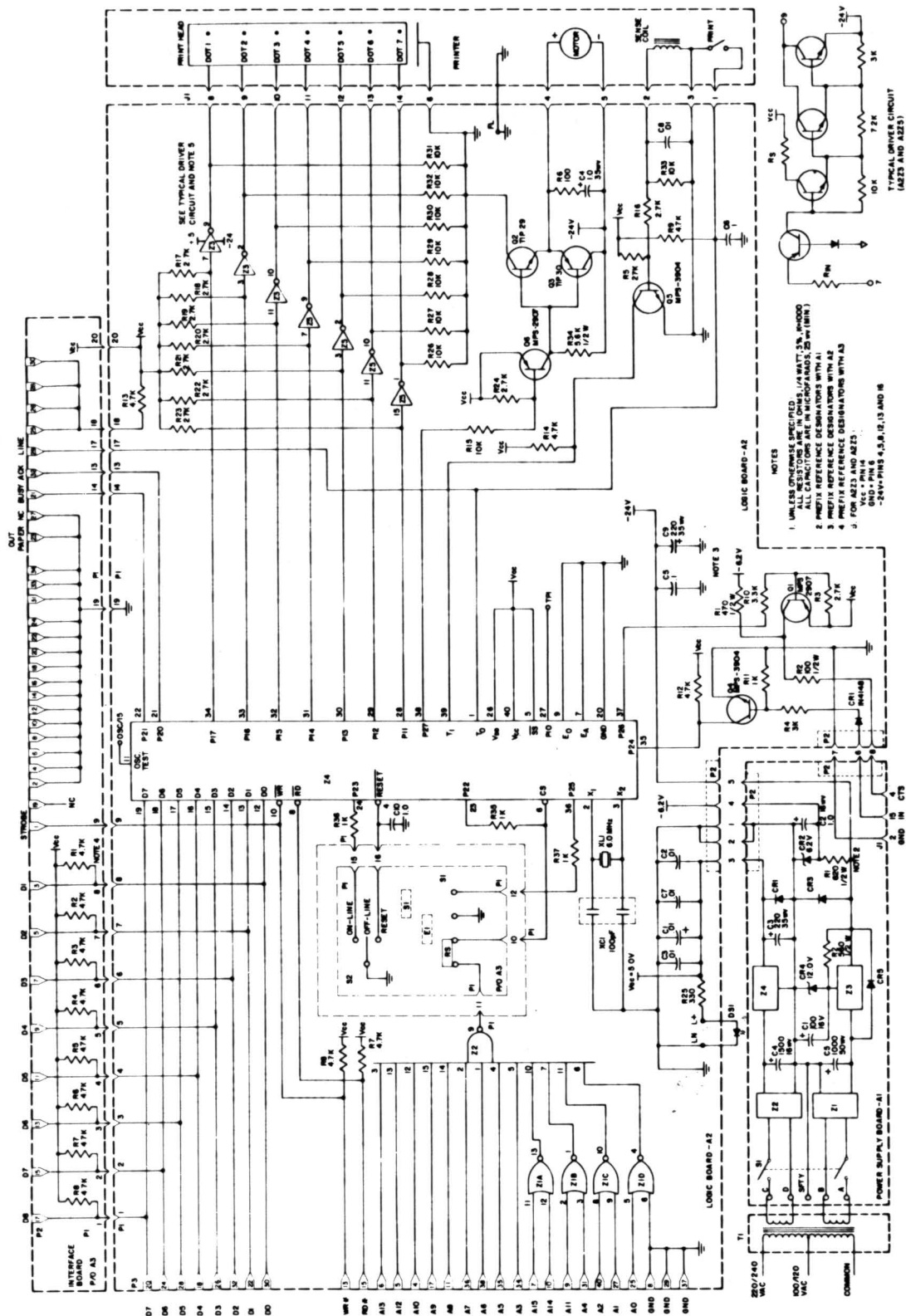
**Figure 6. Removing the paper cutter**

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## Specifications

<b>Printing Speed</b>	120 lines per minute 64 characters per second
<b>Characters per Line</b>	32 or 16 (software selectable)
<b>Character Form</b>	5 x 7 dot matrix
<b>Vertical Spacing</b>	6 lines per inch
<b>Horizontal Spacing</b>	18 or 9 characters per inch (software selectable)
<b>Print Head Life</b>	30 million characters
<b>Character Set</b>	Modified Subset of ASCII, 96 characters with upper and lower case
<b>Interfaces</b>	TRS BUS (direct to TRS-80) Expansion Interface (26-1140) Serial (RS-232C) Device, 600 baud
<b>Temperature Ranges</b>	
<b>Operating</b>	23° to 122° F/-5° to +50° C
<b>Storage</b>	-40° to 176° F/-40° to +80° C
<b>Paper</b>	Aluminum-coated, Radio Shack Catalog Number 26-1412
<b>Size</b>	3-5/16" x 6-3/4" 9-1/4" 8.4 cm x 17.2 cm x 23.5 cm (HWD)
<b>Power Requirements</b>	120 VAC, 60 Hz

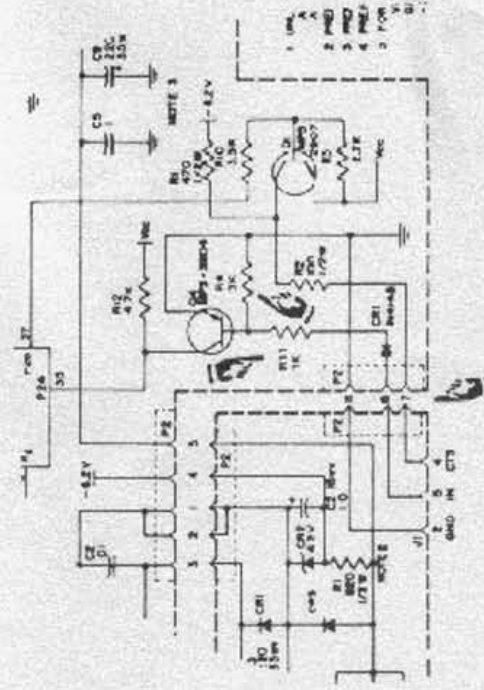
# Schematic Diagram





Addendum for the  
TRS-80 Quick Printer II  
Catalog Number 26-1155


Figure 8, Schematic Diagram on page 35 is in error. The corrections have been made as indicated below:



## LIMITED WARRANTY

For a period of 90 days from the date of delivery, Radio Shack warrants to the original purchaser that the computer hardware described herein shall be free from defects in material and workmanship under normal use and service. This warranty is only applicable to purchases from Radio Shack company-owned retail outlets and through duly authorized franchisees and dealers. The warranty shall be void if this unit's case or cabinet is opened or if the unit is altered or modified. During this period, if a defect should occur, the product must be returned to a Radio Shack store or dealer for repair, and proof of purchase must be presented. Purchaser's sole and exclusive remedy in the event of defect is expressly limited to the correction of the defect by adjustment, repair or replacement at Radio Shack's election and sole expense, except there shall be no obligation to replace or repair items which by their nature are expendable. No representation or other affirmation of fact, including, but not limited to, statements regarding capacity, suitability for use, or performance of the equipment, shall be or be deemed to be a warranty or representation by Radio Shack, for any purpose, nor give rise to any liability or obligation of Radio Shack whatsoever.

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PRINTED IN U.S.A.